JC05 Rec'd PCT/PTO 21 MAR 2002

FORM PTO-1390 (REV. 12-2001) U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY 'S DOCKET NUMBER: BRI-00064

U S. APPLICATION NO (If known, see 37 CFR 1.5): 10/088939

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/AU00/01163	25 September 2000	23 September 1999

TITLE OF INVENTION: VIBRATION SUPPRESSED VEHICLE MIRROR

APPLICANT(S) FOR DO/EO/US: Robert W. Gilbert

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. [ ] This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. [X] The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [X] is attached hereto (required only if not communicated by the International Bureau).
   b. [ ] has been communicated by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [ ] An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. [ ] is attached hereto.
   b. [ ] has been previously submitted under 35 U.S.C. 154(d)(4).
7. [X] Amendments to the claims of the International Aplication under PCT Article 19 (35 U.S.C. 371(c)(3))
   a [ ] are attached hereto (required only if not communicated by the International Bureau).
   b. [ ] have been communicated by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [X] have not been made and will not be made.
8. [ ] An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. [X] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [ ] An English lanugage translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. [ ] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [X] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [X] A FIRST preliminary amendment.
14. [ ] A SECOND or SUBSEQUENT preliminary amendment.
15. [ ] A substitute specification.
16. [ ] A change of power of attorney and/or address letter.
17. [ ] A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. [ ] A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. [ ] A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. [X] Other items or information:

Copy of the Patent Application and Drawings
(International Application Published Under the Patent Cooperation Treaty)
Express Mailing Certificate No. EU 065 973 527 US
Return Receipt Postcard

JC13 Rec'd PCT/PTO 21 MAR 20

U.S. APPLICATION NO (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NUMBER
To be 038939	PCT/AU00/01163	BRI-00064

21. ☒ The following fees are submitted:	CALCULATIONS PTO USE ONLY	
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1040.00**		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$890.00**		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$740.00**		
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$710.00**		
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$1,040.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	30 - 20 =	10	x **$18.00**	$ 180.00	
Independent claims	3 - 3 =		x **$84.00**	$	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ **$280.00**	$	
TOTAL OF ABOVE CALCULATIONS =				$1,220.00	
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2. +				$	
SUBTOTAL =				$1,220.00	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				$	
TOTAL NATIONAL FEE =				$1,220.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property +				$ 40.00	
TOTAL FEES ENCLOSED =				$1,260.00	
				Amount to be refunded:	$
				charged:	$ 1,260.00

a. ☐ A check in the amount of $ _____ to cover the above fees is enclosed.

b. ☒ Please charge my Deposit Account No. 501612 in the amount of $ 1,260.00 to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 501612. A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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10/088
JC13 Rec'd PCT/PTO 21

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March 21, 2002

Hon. Commissioner of Patents and Trademarks
Box DO/EO/US
Washington, D.C. 20231

EU 065973527 US

Sir:

EXPRESS MAILING CERTIFICATE

Applicant: Robert W. Gilbert

Serial No. (if any):

For: VIBRATION SUPPRESSED VEHICLE MIRROR

Docket: BRI-00064

Attorney: Philip R. Warn

"Express Mail" Mailing Label Number . . . . . EU 065 973 527 US

Date of Deposit . . . . . March 21, 2002

I hereby certify and verify that the accompanying Transmittal Letter to the United States Designated/Elected Office (DO/EO/US) Concerning a Filing Under 35 U.S.C. 371 (in duplicate) with Authorization to Charge Deposit Account; along with the enclosures noted therein are being deposited with the United States Postal Service "Express Mail Post Office To Addressee" service under 37 C.F.R. 1.10 on the date indicated above and are addressed to the Honorable Commissioner of Patents and Trademarks, Box DO/EO/US, Washington, D.C. 20231.

Judith M. Zettle
Signature of Person Mailing Documents

10/088939
21 MAR 2002

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the National Phase Application in the United States
of International Patent Application No. PCT/AU00/01163
Filed September 25, 2000

Application No.:	Not assigned yet
Filing Date:	Not assigned yet
Applicant:	Gilbert
Group Art Unit:	Not assigned yet
Examiner:	Not assigned yet
Title:	VIBRATION SUPRESSED VEHICLE MIRROR
Attorney Docket:	BRI-00064

PRELIMINARY AMENDMENT

Commissioner of Patents & Trademarks
Washington, D.C. 20231

Sir:

Prior to examination of the present application, please consider the following. Please amend the above-identified application as follows.

IN THE SPECIFICATION

The specification has been rewritten as follows:

On page 2, the second full paragraph has been rewritten as follows:

According to the invention there is provided a vehicle mirror assembly comprising:

a mirror frame;

a rotor rotatably mounted with respect to the mirror frame;

a member for rotating the rotor with respect to the mirror frame;

a connection member operably interposed between the rotor and the mirror frame allowing pivoting of the rotor with respect to the mirror frame; and

a mirror, having a reflective surface, mounted with respect to the rotor so that the surface remains substantially parallel to the plane in which the rotor rotates,

whereby the rotor stabilises the mirror against tilting vibrational movement.

On page 2, the third full paragraph has been rewritten as follows:

Preferably the connection member is arranged and constructed such that the angle of the mirror surface, with respect to the mirror frame, can be adjusted.

On pages 2-3, the paragraph spanning pages 2-3 has been rewritten as follows:

Preferably the connection member comprises:

a pivot mounting interposed between the mirror frame and the support portion; and

at least two legs operably interposed between the mirror frame and the support portion, each leg comprising an actuator for adjusting the no-load length of the leg and a vibration absorber connected in series to the actuator,

wherein the actuator enables adjustment of the timed-averaged orientation of the mirror with respect to the mirror frame and the vibration absorbers reduce the transmission of vibration forces from the mirror frame to the support portion.

On page 3, the first full paragraph has been rewritten as follows:

The connection member, connecting the support portion (and hence rotor) to the mirror frame, ensures that the mirror will not follow high frequency tilting movements of

the mirror frame. At the same time the connection member will ensure that the rotor stabilised mirror will generally remain in the same angular orientation with respect to the vehicle to which the mirror frame is attached.

On page 3, the third full paragraph has been rewritten as follows:

According to a first aspect of the invention, the member for rotating the rotor is preferably air driven.

On page 3, the fourth full paragraph has been rewritten as follows:

According to a second aspect of the invention, the member for rotating the rotor preferably comprises an electric motor.

On page 5, the first full paragraph has been rewritten as follows:

Interposed between the support portion 30 and the mirror case 14 is a connection member in the form of a pivot mounting 36 and two legs 20 and 60. Pivot mounting 36 allows pivoting of the flywheel and mirror with respect to the mirror case 14.

On page 5, the third full paragraph has been rewritten as follows:

The above-described connection member, connecting the support portion 30 (and hence flywheel 34) to the mirror frame (case) 14, ensures that the mirror 40 will not follow high frequency tilting movements of the mirror case 14. At the same time the connection member ensures that the flywheel stabilised mirror 40 will generally remain in the same angular orientation with respect to the vehicle to which the mirror case 14 is mounted. It also enables the rear view provided by the mirror 40 to be adjusted to suit the vehicle driver.

On page 6, the second full paragraph has been rewritten as follows:

Fig 6 is a rear perspective view of the third embodiment of the invention shown in Fig 5. In this third embodiment of the invention, the flywheel is air driven instead of motor driven. Air enters the mirror casing 14 through the entrance 17 of a duct 16 and then passes vanes 35 before exiting the mirror case 14 through its rear. This air movement imparts rotation to the flywheel. Various other air driven members for rotating the flywheel may be used.

On Page 7, the first line has been rewritten as follows:

What is claimed is:

After the claims, the following text has been inserted:

Abstract

A vehicle external rear vision mirror assembly is described. The assembly includes a support arm; a mirror frame mounted on an end of the support arm; a support portion connected to the mirror frame; a flywheel rotatably mounted with respect to the support portion; a member for rotating the flywheel; a mirror mounted to the support portion, the mirror having a reflective surface orientated substantially normal to the rotational axis of the flywheel; and a connection member connecting the support portion to the mirror frame, the connection member arranged and constructed such that the angle of the support portion, with respect to the mirror frame, can be adjusted, whereby the flywheel stabilizes the mirror against tilting vibrational movement. The mirror may be mounted either to the support portion (and therefore non-rotatable) or may be mounted directly to the flywheel.

IN THE CLAIMS

The claims have been rewritten as follows:

1. (Amended) A vehicle mirror assembly comprising:

a mirror frame;

a rotor rotatably mounted with respect to the mirror frame;

a member for rotating the rotor with respect to the mirror frame;

a connection member operably interposed between the rotor and the mirror frame allowing pivoting of the rotor with respect to the mirror frame; and

a mirror, having a reflective surface, mounted with respect to the rotor so that the surface remains substantially parallel to the plane in which the rotor rotates,

whereby the rotor stabilises the mirror against tilting vibrational movement.

2. (Amended) A vehicle mirror assembly as claimed in claim 1, wherein the connection member is arranged and constructed such that the angle of the mirror surface, with respect to the mirror frame, can be adjusted.

3. (Amended) A vehicle mirror assembly as claimed in claim 2 further comprising a support portion interposed between the mirror frame and the rotor, the support portion supporting the rotor.

4. (Amended) A vehicle mirror assembly as claimed in claim 3, wherein the connection member comprises:

a pivot mounting interposed between the mirror frame and the support portion; and

at least two legs operably interposed between the mirror frame and the support portion, each leg comprising an actuator for adjusting the no-load length of the leg and a vibration absorber connected in series to the actuator,

wherein the actuator enables adjustment of the timed-averaged orientation of the mirror with respect to the mirror frame and the vibration absorbers reduce the transmission of vibration forces from the mirror frame to the support portion.

5. (Amended) A vehicle mirror assembly as claimed in claim 4, wherein the vibration absorbers each comprises a spring member and a damper member operable in parallel.

6. (Amended) A vehicle mirror assembly as claimed in claim 1, wherein the rotor is a substantially disc-shaped flywheel.

8. (Amended) A vehicle mirror assembly as claimed in claim 1, wherein the member for rotating the rotor is air driven.

9. (Amended) A vehicle mirror assembly as claimed in claim 8, wherein the member for rotating comprises vanes mounted to the rotor and an air passage arranged and constructed so as to direct air through the vanes.

10. (Amended) A vehicle mirror assembly as claimed in claim 1, wherein the member for rotating the rotor comprises an electric motor.

11. (Amended) A vehicle mirror assembly as claimed in claim 1, wherein the

mirror frame comprises a case substantially encapsulating the support portion, rotor and mirror from behind the mirror surface.

12. (Amended) A vehicle external rear vision mirror assembly comprising:

a support arm having a proximal and a distal end, the distal end for attaching to a vehicle;

a mirror frame mounted on or integral with the proximal end of the support arm;

a support portion connected to the mirror frame;

a rotor rotatably mounted with respect to the support portion;

a member for rotating the rotor;

a mirror mounted to the support portion, the mirror having a reflective surface orientated substantially normal to the rotational axis of the rotor; and

a connection member connecting the support portion to the mirror frame, the connection member arranged and constructed such that the angle of the support portion, with respect to the mirror frame, can be adjusted, whereby the rotor stabilises the mirror against tilting vibrational movement.

13. (Amended) A mirror assembly as claimed in claim 12 wherein the connection member comprises:

a pivot mounting interposed between the mirror frame and the support portion; and

at least two legs operably interposed between the mirror frame and the support portion, each leg comprising an actuator for adjusting the no-load length of the leg and a vibration absorber connected in series to the actuator,

wherein the actuator enables adjustment of the time-averaged orientation of the mirror with respect to the mirror frame and the vibration absorbers reduce the transmission of vibration forces from the mirror frame to the support portion.

14. (Amended) A mirror assembly as claimed in claim 13 wherein the vibration absorbers each comprises a spring member and a damper member operable in parallel.

15. (Amended) A mirror assembly as claimed in claim 12, wherein the rotor is a substantially disc shaped flywheel.

17. (Amended) A vehicle mirror assembly as claimed in claim 12, wherein the member for rotating the rotor is air driven.

18. (Amended) A vehicle mirror assembly as claimed in claim 17, wherein the member for rotating comprises vanes mounted to the rotor and an air passage arranged and constructed so as to direct air through the vanes.

19. (Amended) A vehicle mirror assembly as claimed in claim 12, wherein the member for rotating the rotor comprises an electric motor.

20. (Amended) A vehicle mirror assembly as claimed in claim 12, wherein the mirror frame comprises a case substantially encapsulating the support portion, rotor and mirror from behind the mirror surface.

21. (Amended) A vehicle external rear vision mirror assembly comprising:

a support arm having a proximal and a distal end, the distal end for attaching to a vehicle;

a mirror frame mounted on or integral with the proximal end of the support arm;

a support portion connected to the mirror frame;

a rotor rotatably mounted with respect to the support portion;

a member for rotating the rotor;

a mirror mounted directly to, or integral with the rotor, the mirror having a reflective surface orientated substantially normal to the rotational axis of the rotor; and

a connection member connecting the support portion to the mirror frame, the connection member arranged and constructed such that the angle of the support portion, with respect to the mirror frame, can be adjusted,

whereby the rotor stabilises the mirror against tilting vibrational movement.

22. (Amended) A mirror assembly as claimed in claim 21 wherein the connection member comprises:

a pivot mounting interposed between the mirror frame and the support portion; and

at least two legs operably interposed between the mirror frame and the support portion, each leg comprising a actuator for adjusting the no-load length of the leg and a vibration absorber connected in series to the actuator,

wherein the actuator enables adjustment of the time-averaged orientation of the mirror with respect to the mirror frame and the vibration absorbers reduce the transmission of vibration forces from the mirror frame to the support portion.

23. (Amended) A mirror assembly as claimed in claim 22 wherein the vibration absorbers each comprises a spring member and a damper member operable in parallel.

24. (Amended) A mirror assembly as claimed in claim 20 wherein the rotor is a substantially disc shaped flywheel.

26. (Amended) A vehicle mirror assembly as claimed in claim 20, wherein the member for rotating the rotor is air driven.

27. (Amended) A vehicle mirror assembly as claimed in claim 26, wherein the member for rotating comprises vanes mounted to the rotor and an air passage arranged and constructed so as to direct air through the vanes.

28. (Amended) A vehicle mirror assembly as claimed in claim 20, wherein the member for rotating the rotor comprises an electric motor.

29. (Amended) A vehicle mirror assembly as claimed in claim 20, wherein the mirror frame comprises a case substantially encapsulating the support portion, rotor and mirror from behind the mirror surface.

30. (Amended) A mirror assembly as claimed in claim 21 wherein the rotor is eccentrically mounted so that its rotation causes lateral vibration,

whereby the vibration reduced the adhesion of water droplets to the mirror surface.

REMARKS

Claims 1-6, 8-15, 17-24 and 26-30 have been amended. Support for these amendments can be found throughout the specification and drawings, as originally filed.

The specification has been amended to correct minor typographical, grammatical and syntax errors. The Applicants aver that no new matter has been added to the instant application.

Additionally, the Applicants have provided an Abstract section to the instant application. A separate sheet containing the Abstract is submitted herewith. The Applicants aver that no new matter has been added to the instant application.

The Applicants respectfully request entry of the above amendments. The Applicants submit that no new matter has been added. The Applicants respectfully submit that the application is in condition for substantive examination, and such examination is respectfully requested.

Respectfully submitted,

WARN, BURGESS & HOFFMANN, P.C.
Attorneys for Applicants

By: _____

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Dated: March 21, 2002

PRW/PHS/phs

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION

On page 2, the second full paragraph has been rewritten as follows:

According to the invention there is provided a vehicle mirror assembly comprising:

a mirror frame;

a rotor rotatably mounted with respect to the mirror frame;

a [means] member for rotating the rotor with respect to the mirror frame;

a connection [means] member operably interposed between the rotor and the mirror frame allowing pivoting of the rotor with respect to the mirror frame; and

a mirror, having a reflective surface, mounted with respect to the rotor so that the surface remains substantially parallel to the plane in which the rotor rotates,

whereby the rotor stabilises the mirror against tilting vibrational movement.

On page 2, the third full paragraph has been rewritten as follows:

Preferably the connection [means] member is arranged and constructed such that the angle of the mirror surface, with respect to the mirror frame, can be adjusted.

On pages 2-3, the paragraph spanning pages 2-3 has been rewritten as follows:

Preferably the connection [means] member comprises:

a pivot mounting interposed between the mirror frame and the support portion; and

at least two legs operably interposed between the mirror frame and the support portion, each leg comprising an actuator for adjusting the no-load length of the

leg and a vibration absorber connected in series to the actuator,

wherein the actuator enables adjustment of the timed-averaged orientation of the mirror with respect to the mirror frame and the vibration absorbers reduce the transmission of vibration forces from the mirror frame to the support portion.

On page 3, the first full paragraph has been rewritten as follows:

The connection [means] member, connecting the support portion (and hence rotor) to the mirror frame, ensures that the mirror will not follow high frequency tilting movements of the mirror frame. At the same time the connection [means] member will ensure that the rotor stabilised mirror will generally remain in the same angular orientation with respect to the vehicle to which the mirror frame is attached.

On page 3, the third full paragraph has been rewritten as follows:

According to a first aspect of the invention, the [means] member for rotating the rotor is preferably air driven.

On page 3, the fourth full paragraph has been rewritten as follows:

According to a second aspect of the invention, the [means] member for rotating the rotor preferably comprises an electric motor.

On page 5, the first full paragraph has been rewritten as follows:

Interposed between the support portion 30 and the mirror case 14 is a connection [means] member in the form of a pivot mounting 36 and two legs 20 and 60. Pivot mounting 36 allows pivoting of the flywheel and mirror with respect to the mirror case 14.

On page 5, the third full paragraph has been rewritten as follows:

The above-described connection [means] member, connecting the support portion 30 (and hence flywheel 34) to the mirror frame (case) 14, ensures that the mirror 40 will not follow high frequency tilting movements of the mirror case 14. At the same time the connection [means] member ensures that the flywheel stabilised mirror 40 will generally remain in the same angular orientation with respect to the vehicle to which the mirror case 14 is mounted. It also enables the rear view provided by the mirror 40 to be adjusted to suit the vehicle driver.

On page 6, the second full paragraph has been rewritten as follows:

Fig 6 is a rear perspective view of the third embodiment of the invention shown in Fig 5. In this third embodiment of the invention, the flywheel is air driven instead of motor driven. Air enters the mirror casing 14 through the entrance 17 of a duct 16 and then passes vanes 35 before exiting the mirror case 14 through its rear. This air movement imparts rotation to the flywheel. Various other air driven [means] members for rotating the flywheel may be used.

On Page 7, the first line has been rewritten as follows:

[THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS] What is claimed is:

IN THE CLAIMS

The claims have been rewritten as follows:

1. (Amended) A vehicle mirror assembly comprising:

a mirror frame;

a rotor rotatably mounted with respect to the mirror frame;

a [means] member for rotating the rotor with respect to the mirror frame;

a connection [means] member operably interposed between the rotor and the mirror frame allowing pivoting of the rotor with respect to the mirror frame; and

a mirror, having a reflective surface, mounted with respect to the rotor so that the surface remains substantially parallel to the plane in which the rotor rotates,

whereby the rotor stabilises the mirror against tilting vibrational movement.

2. (Amended) A vehicle mirror assembly as claimed in claim 1, wherein the connection [means] member is arranged and constructed such that the angle of the mirror surface, with respect to the mirror frame, can be adjusted.

3. (Amended) A vehicle mirror assembly as claimed in claim 2 further comprising a support portion interposed between the mirror frame and the rotor, the support portion supporting the rotor.

4. (Amended) A vehicle mirror assembly as claimed in claim 3, wherein the connection [means] member comprises:

a pivot mounting interposed between the mirror frame and the support portion; and

at least two legs operably interposed between the mirror frame and the support portion, each leg comprising an actuator for adjusting the no-load length of the leg and a vibration absorber connected in series to the actuator,

wherein the actuator enables adjustment of the timed-averaged orientation of the mirror with respect to the mirror frame and the vibration absorbers reduce the

transmission of vibration forces from the mirror frame to the support portion.

5. (Amended) A vehicle mirror assembly as claimed in claim 4, wherein the vibration absorbers each comprises a spring [means] member and a damper [means] member operable in parallel.

6. (Amended) A vehicle mirror assembly as claimed in [any one of claims] claim 1 [to 5], wherein the rotor is a substantially disc-shaped flywheel.

8. (Amended) A vehicle mirror assembly as claimed in [any one of claims] claim 1 [to 7], wherein the [means] member for rotating the rotor is air driven.

9. (Amended) A vehicle mirror assembly as claimed in claim 8, wherein the [means] member for rotating comprises vanes mounted to the rotor and an air passage arranged and constructed so as to direct air through the vanes.

10. (Amended) A vehicle mirror assembly as claimed in [any one of claims] claim 1 [to 7], wherein the [means] member for rotating the rotor comprises an electric motor.

11. (Amended) A vehicle mirror assembly as claimed in [any one of claims] claim 1 [to 10], wherein the mirror frame comprises a case substantially encapsulating the support portion, rotor and mirror from behind the mirror surface.

12. (Amended) A vehicle external rear vision mirror assembly comprising:

a support arm having a proximal and a distal end, the distal end for attaching to a vehicle;

a mirror frame mounted on or integral with the proximal end of the support arm;

a support portion connected to the mirror frame;

a rotor rotatably mounted with respect to the support portion;

a [means] member for rotating the rotor;

a mirror mounted to the support portion, the mirror having a reflective surface orientated substantially normal to the rotational axis of the rotor; and

a connection [means] member connecting the support portion to the mirror frame, the connection [means] member arranged and constructed such that the angle of the support portion, with respect to the mirror frame, can be adjusted, whereby the rotor stabilises the mirror against tilting vibrational movement.

13. (Amended) A mirror assembly as claimed in claim 12 wherein the connection [means] member comprises:

a pivot mounting interposed between the mirror frame and the support portion; and

at least two legs operably interposed between the mirror frame and the support portion, each leg comprising an actuator for adjusting the no-load length of the leg and a vibration absorber connected in series to the actuator,

wherein the actuator enables adjustment of the time-averaged orientation of the mirror with respect to the mirror frame and the vibration absorbers reduce the transmission of vibration forces from the mirror frame to the support portion.

14. (Amended) A mirror assembly as claimed in claim 13 wherein the vibration absorbers each comprises a spring [means] member and a damper [means] member operable in parallel.

15. (Amended) A mirror assembly as claimed in [any one of claims] claim 12 [to 14], wherein the rotor is a substantially disc shaped flywheel.

17. (Amended) A vehicle mirror assembly as claimed in [any one of claims] claim 12 [to 16], wherein the [means] member for rotating the rotor is air driven.

18. (Amended) A vehicle mirror assembly as claimed in claim 17, wherein the [means] member for rotating comprises vanes mounted to the rotor and an air passage arranged and constructed so as to direct air through the vanes.

19. (Amended) A vehicle mirror assembly as claimed in [any one of claims] claim 12 [to 16], wherein the [means] member for rotating the rotor comprises an electric motor.

20. (Amended) A vehicle mirror assembly as claimed in [any one of claims] claim 12 [to 19], wherein the mirror frame comprises a case substantially encapsulating the support portion, rotor and mirror from behind the mirror surface.

21. (Amended) A vehicle external rear vision mirror assembly comprising:

a support arm having a proximal and a distal end, the distal end for attaching to a vehicle;

a mirror frame mounted on or integral with the proximal end of the support arm;

a support portion connected to the mirror frame;

a rotor rotatably mounted with respect to the support portion;

a [means] member for rotating the rotor;

a mirror mounted directly to, or integral with the rotor, the mirror having a reflective surface orientated substantially normal to the rotational axis of the rotor; and

a connection [means] member connecting the support portion to the mirror frame, the connection [means] member arranged and constructed such that the angle of the support portion, with respect to the mirror frame, can be adjusted,

whereby the rotor stabilises the mirror against tilting vibrational movement.

22. (Amended) A mirror assembly as claimed in claim 21 wherein the connection [means] member comprises:

a pivot mounting interposed between the mirror frame and the support portion; and

at least two legs operably interposed between the mirror frame and the support portion, each leg comprising a actuator for adjusting the no-load length of the leg and a vibration absorber connected in series to the actuator,

wherein the actuator enables adjustment of the time-averaged orientation of the mirror with respect to the mirror frame and the vibration absorbers reduce the transmission of vibration forces from the mirror frame to the support portion.

23. (Amended) A mirror assembly as claimed in claim 22 wherein the vibration absorbers each comprises a spring [means] member and a damper [means]

member operable in parallel.

24. (Amended) A mirror assembly as claimed in [any one of claims] claim 20 [to 23] wherein the rotor is a substantially disc shaped flywheel.

26. (Amended) A vehicle mirror assembly as claimed in [any one of claims] claim 20 [to 25], wherein the [means] member for rotating the rotor is air driven.

27. (Amended) A vehicle mirror assembly as claimed in claim 26, wherein the [means] member for rotating comprises vanes mounted to the rotor and an air passage arranged and constructed so as to direct air through the vanes.

28. (Amended) A vehicle mirror assembly as claimed in [any one of claims] claim 20 [to 25], wherein the [means] member for rotating the rotor comprises an electric motor.

29. (Amended) A vehicle mirror assembly as claimed in [any one of claims] claim 20 [to 28], wherein the mirror frame comprises a case substantially encapsulating the support portion, rotor and mirror from behind the mirror surface.

30. (Amended) A mirror assembly as claimed in [any one of claims] claim 21 [to 29] wherein the rotor is eccentrically mounted so that its rotation causes lateral vibration,

whereby the vibration reduced the adhesion of water droplets to the mirror surface.

Abstract

A vehicle external rear vision mirror assembly is described. The assembly includes a support arm; a mirror frame mounted on an end of the support arm; a support portion connected to the mirror frame; a flywheel rotatably mounted with respect to the support portion; a member for rotating the flywheel; a mirror mounted to the support portion, the mirror having a reflective surface orientated substantially normal to the rotational axis of the flywheel; and a connection member connecting the support portion to the mirror frame, the connection member arranged and constructed such that the angle of the support portion, with respect to the mirror frame, can be adjusted, whereby the flywheel stabilizes the mirror against tilting vibrational movement. The mirror may be mounted either to the support portion (and therefore non-rotatable) or may be mounted directly to the flywheel.

VIBRATION SUPPRESSED VEHICLE MIRROR

The present invention relates to vehicle mounted mirrors, and in particular to vehicle rear vision mirrors mounted external to the vehicle cabin.

BACKGROUND

With any vehicle mirror, it is important to stabilise the position of the reflective mirror surface providing the rear view with respect to either the vehicle or with respect to the driver. Vibration causing rotational movement of the reflective mirror surface can present a moving or fuzzy rear view image to the vehicle driver. Sources of vibration include the vehicle's engine and small scale vertical vehicle movement caused by the road surface.

In order to provide rear vision to the side of a vehicle, many vehicles have mirrors mounted external to their cabin. Such mirrors either provide an alternative rear view to an internally mounted mirror or, in the case of many trucks, provide the only rear view.

Stabilisation of externally mounted mirrors is more difficult than stabilisation of internally mounted mirrors for a number of reasons. Externally mounted mirror housings are subject to additional forces (for example aerodynamic forces) and are often more complex in their design. For instance, external mirrors often require an ability to break away upon impact with a pedestrian and therefore have pivots and detent mechanisms between a vehicle body and the mirror surface. External mirrors often have motor drive systems for remote adjustment of their position and heating equipment to prevent fogging and/or icing. These additional systems add weight. Heavier mirror housings have greater inertia and therefore are more difficult to attach to the vehicle in a way that ensures they do not vibrate with respect to the vehicle. Generally heavier mirrors are supported by larger and stiffer cantilevered arms. This adds to the cost of the vehicle and can detract from the appearance of the vehicle.

It is an object of the present invention to provide a vehicle mirror assembly that stabilises a mirror reflective surface against tilting vibration and thereby overcomes at least some of the aforementioned problems.

SUMMARY OF THE INVENTION

According to the invention there is provided a vehicle mirror assembly comprising:

a mirror frame;

a rotor rotatably mounted with respect to the mirror frame;

a means for rotating the rotor with respect to the mirror frame;

a connection means operably interposed between the rotor and the mirror frame allowing pivoting of the rotor with respect to the mirror frame; and

a mirror, having a reflective surface, mounted with respect to the rotor so that the surface remains substantially parallel to the plane in which the rotor rotates,

whereby the rotor stabilises the mirror against tilting vibrational movement.

Preferably the connection means is arranged and constructed such that the angle of the mirror surface, with respect to the mirror frame, can be adjusted.

Preferably the vehicle mirror assembly comprises a support portion interposed between the mirror frame and the rotor, the support portion supporting the rotor.

The mirror may be mounted either to the support portion (and therefore non-rotatable) or may be mounted directly to the rotor.

Preferably the connection means comprises:

a pivot mounting interposed between the mirror frame and the support portion; and

at least two legs operably interposed between the mirror frame and the support portion, each leg comprising an actuator for adjusting the no-load length of the leg and a vibration absorber connected in series to the actuator,

wherein the actuator enables adjustment of the timed-averaged orientation of the mirror with respect to the mirror frame and the vibration absorbers reduce the transmission of vibration forces from the mirror frame to the support portion.

The connection means, connecting the support portion (and hence rotor) to the mirror frame, ensures that the mirror will not follow high frequency tilting movements of the mirror frame. At the same time the connection means will ensure that the rotor stabilised mirror will generally remain in the same angular orientation with respect to the vehicle to which the mirror frame is attached.

Preferably the rotor is a substantially disc-shaped flywheel having a diameter of at least two thirds of the smallest bisector of the mirror surface.

According to a first aspect of the invention, the means for rotating the rotor is preferably air driven.

According to a second aspect of the invention, the means for rotating the rotor preferably comprises an electric motor.

The mirror frame preferably comprises a mirror case that substantially encapsulates the support portion, rotor and mirror from behind the mirror surface.

Specific embodiments of the invention will now be described in some further detail with reference to and as illustrated in the accompanying figures. These embodiments are illustrative, and are not meant to be restrictive of the scope of the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

Preferred embodiments of the invention are illustrated in the accompanying representations in which:

Fig 1 shows a rear view of the mirror assembly according to a first embodiment of the invention; and

Fig 2 shows a cross sectional view of the mirror assembly of Fig 1 through the plane 2-2 as indicated on Fig 1.

Fig 3 shows a rear view of a mirror assembly according to a second embodiment of the invention.

Fig 4 shows a cross section view of the mirror assembly of Fig 3 through the plane 4-4 as indicated on Fig 3.

Fig 5 shows a rear view of a mirror assembly according to a third embodiment of the invention.

Fig 6 shows a front perspective view of the mirror assembly of Fig 5.

Referring to Figs 1 and 2, a vehicle mirror assembly 10 is shown for mounting external to a vehicle. In this first embodiment of the invention the vehicle mirror assembly 10 comprises a support arm 12 for connection to a vehicle, a mirror frame in the form of a mirror case 14 and a rotor stabilised mirror 40. The rotor is in the form of a flywheel 34, although other rotor shapes could be used. A support portion 30 is provided to support the flywheel 34 and the mirror 40. A motor 32 is housed within the support portion 30. Motor 32 rotates flywheel 34 to create a gyroscope that has the effect of stabilising the mirror 40 and in particular preventing tilting vibrational movement being transmitted from the mirror frame (case) 14 to the mirror 40. This

arrangement allows support arm 12 to be relatively small and less stiff than would otherwise be required to prevent tilting vibration of the mirror 40.

Interposed between the support portion 30 and the mirror case 14 is a connection means in the form of a pivot mounting 36 and two legs 20 and 60. Pivot mounting 36 allows pivoting of the flywheel and mirror with respect to the mirror case 14.

Pivoting of the mirror 40 with respect to the mirror case 14 is controlled by legs 20 and 60. Each of these legs includes an actuator 22 for adjusting the no-load length of the leg and a vibration absorber in the form of a spring 24 and a damper 26 connected in series to the actuator 22. The vibration absorbers reduce the transmission of vibration from the mirror case 14 to the support portion 30 (and therefore the mirror 40).

The above-described connection means, connecting the support portion 30 (and hence flywheel 34) to the mirror frame (case) 14, ensures that the mirror 40 will not follow high frequency tilting movements of the mirror case 14. At the same time the connection means ensures that the flywheel stabilised mirror 40 will generally remain in the same angular orientation with respect to the vehicle to which the mirror case 14 is mounted. It also enables the rear view provided by the mirror 40 to be adjusted to suit the vehicle driver.

A second embodiment of the invention is shown in Figs 3 and 4. In this embodiment of the invention the mirror 40 is mounted directly to the flywheel 34 (rather than on the support portion 30). With this embodiment of the invention the mirror itself rotates. This arrangement has the advantage that water droplets are less likely to adhere to the mirror surface. In a variation of this embodiment, the flywheel 34 is eccentrically mounted so that its rotation causes lateral vibration. This lateral vibration further reduces the adhesion of water droplets to the mirror surface.

Fig 5 shows a third embodiment of the invention having two additional features. A second non-rotating and non-flywheel stabilised mirror 50 is provided. This mirror optionally may be a concave mirror for showing a wide rear view to the vehicle driver. Actuators may be positioned to ensure adjustment of the angle of mirror 50. The primary mirror 40 is mounted to a flywheel, as described in the second embodiment of the invention, and therefore is vibration stabilised and repels water from its surface.

Fig 6 is a rear perspective view of the third embodiment of the invention shown in Fig 5. In this third embodiment of the invention, the flywheel is air driven instead of motor driven. Air enters the mirror casing 14 through the entrance 17 of a duct 16 and then passes vanes 35 before exiting the mirror case 14 through its rear. This air movement imparts rotation to the flywheel. Various other air driven means for rotating the flywheel may be used.

Motor drive 32 may take various forms. For instance the motor's rotor itself may provide the rotational inertia required to produce the desired stabilisation.

Various types of rotors or flywheels may be employed to provide stability to the mirror based on the gyroscopic effect they produce.

While the present invention has been described in terms of preferred embodiments in order to facilitate better understanding of the invention, it should be appreciated that various modifications can be made without departing from the principles of the invention. Therefore the invention should be understood to include all such modifications within its scope.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A vehicle mirror assembly comprising:

a mirror frame;

a rotor rotatably mounted with respect to the mirror frame;

a means for rotating the rotor with respect to the mirror frame;

a connection means operably interposed between the rotor and the mirror frame allowing pivoting of the rotor with respect to the mirror frame; and

a mirror, having a reflective surface, mounted with respect to the rotor so that the surface remains substantially parallel to the plane in which the rotor rotates,

whereby the rotor stabilises the mirror against tilting vibrational movement.

2. A vehicle mirror assembly as claimed in claim 1, wherein the connection means is arranged and constructed such that the angle of the mirror surface, with respect to the mirror frame, can be adjusted.

3. A vehicle mirror assembly as claimed in claim 2 comprising a support portion interposed between the mirror frame and the rotor, the support portion supporting the rotor.

4. A vehicle mirror assembly as claimed in claim 3, wherein the connection means comprises:

a pivot mounting interposed between the mirror frame and the support portion; and

at least two legs operably interposed between the mirror frame and the support portion, each leg comprising an actuator for adjusting the no-load length of the leg and a vibration absorber connected in series to the actuator,

wherein the actuator enables adjustment of the timed-averaged orientation of the mirror with respect to the mirror frame and the vibration absorbers reduce the transmission of vibration forces from the mirror frame to the support portion.

5. A vehicle mirror assembly as claimed in claim 4, wherein the vibration absorbers each comprises a spring means and a damper means operable in parallel.

6. A vehicle mirror assembly as claimed in any one of claims 1 to 5, wherein the rotor is a substantially disc-shaped flywheel.

7. A vehicle mirror assembly as claimed in claim 6, wherein the flywheel has a diameter of at least two thirds of the smallest bisector of the mirror surface.

8. A vehicle mirror assembly as claimed in any one of claims 1 to 7, wherein the means for rotating the rotor is air driven.

9. A vehicle mirror assembly as claimed in claim 8, wherein the means for rotating comprises vanes mounted to the rotor and an air passage arranged and constructed so as to direct air through the vanes.

10. A vehicle mirror assembly as claimed in any one of claims 1 to 7, wherein the means for rotating the rotor comprises an electric motor.

11. A vehicle mirror assembly as claimed in any one of claims 1 to 10, wherein the mirror frame comprises a case substantially encapsulating the support portion, rotor and mirror from behind the mirror surface.

12. A vehicle external rear vision mirror assembly comprising:

a support arm having a proximal and a distal end, the distal end for attaching to a vehicle;

a mirror frame mounted on or integral with the proximal end of the support arm;

a support portion connected to the mirror frame;

a rotor rotatably mounted with respect to the support portion;

a means for rotating the rotor;

a mirror mounted to the support portion, the mirror having a reflective surface orientated substantially normal to the rotational axis of the rotor; and

a connection means connecting the support portion to the mirror frame, the connection means arranged and constructed such that the angle of the support portion, with respect to the mirror frame, can be adjusted,

whereby the rotor stabilises the mirror against tilting vibrational movement.

13. A mirror assembly as claimed in claim 12 wherein the connection means comprises:

a pivot mounting interposed between the mirror frame and the support portion; and

at least two legs operably interposed between the mirror frame and the support portion, each leg comprising an actuator for adjusting the no-load length of the leg and a vibration absorber connected in series to the actuator,

wherein the actuator enables adjustment of the time-averaged orientation of the mirror with respect to the mirror frame and the vibration absorbers reduce the transmission of vibration forces from the mirror frame to the support portion.

14. A mirror assembly as claimed in claim 13 wherein the vibration absorbers each comprises a spring means and a damper means operable in parallel.

15. A mirror assembly as claimed in any one of claims 12 to 14, wherein the rotor is a substantially disc shaped flywheel.

16. A vehicle mirror assembly as claimed in claim 15, wherein the flywheel has a diameter of at least two thirds of the smallest bisector of the mirror surface.

17. A vehicle mirror assembly as claimed in any one of claims 12 to 16, wherein the means for rotating the rotor is air driven.

18. A vehicle mirror assembly as claimed in claim 17, wherein the means for rotating comprises vanes mounted to the rotor and an air passage arranged and constructed so as to direct air through the vanes.

19. A vehicle mirror assembly as claimed in any one of claims 12 to 16, wherein the means for rotating the rotor comprises an electric motor.

20. A vehicle mirror assembly as claimed in any one of claims 12 to 19, wherein the mirror frame comprises a case substantially encapsulating the support portion, rotor and mirror from behind the mirror surface.

21. A vehicle external rear vision mirror assembly comprising:

a support arm having a proximal and a distal end, the distal end for attaching to a vehicle;

a mirror frame mounted on or integral with the proximal end of the support arm;

a support portion connected to the mirror frame;

a rotor rotatably mounted with respect to the support portion;

a means for rotating the rotor;

a mirror mounted directly to, or integral with the rotor, the mirror having a reflective surface orientated substantially normal to the rotational axis of the rotor; and

a connection means connecting the support portion to the mirror frame, the connection means arranged and constructed such that the angle of the support portion, with respect to the mirror frame, can be adjusted,

whereby the rotor stabilises the mirror against tilting vibrational movement.

22. A mirror assembly as claimed in claim 21 wherein the connection means comprises:

a pivot mounting interposed between the mirror frame and the support portion; and

at least two legs operably interposed between the mirror frame and the support portion, each leg comprising a actuator for adjusting the no-load length of the leg and a vibration absorber connected in series to the actuator,

wherein the actuator enables adjustment of the time-averaged orientation of the mirror with respect to the mirror frame and the vibration absorbers reduce the transmission of vibration forces from the mirror frame to the support portion.

23. A mirror assembly as claimed in claim 22 wherein the vibration absorbers each comprises a spring means and a damper means operable in parallel.

24. A mirror assembly as claimed in any one of claims 20 to 23 wherein the rotor is a substantially disc shaped flywheel.

25. A vehicle mirror assembly as claimed in claim 24, wherein the flywheel has a diameter of at least two thirds of the smallest bisector of the mirror surface.

26. A vehicle mirror assembly as claimed in any one of claims 20 to 25, wherein the means for rotating the rotor is air driven.

27. A vehicle mirror assembly as claimed in claim 26, wherein the means for rotating comprises vanes mounted to the rotor and an air passage arranged and constructed so as to direct air through the vanes.

28. A vehicle mirror assembly as claimed in any one of claims 20 to 25, wherein the means for rotating the rotor comprises an electric motor.

29. A vehicle mirror assembly as claimed in any one of claims 20 to 28, wherein the mirror frame comprises a case substantially encapsulating the support portion, rotor and mirror from behind the mirror surface.

30. A mirror assembly as claimed in any one of claims 21 to 29 wherein the rotor is eccentrically mounted so that its rotation causes lateral vibration,

whereby the vibration reduced the adhesion of water droplets to the mirror surface.

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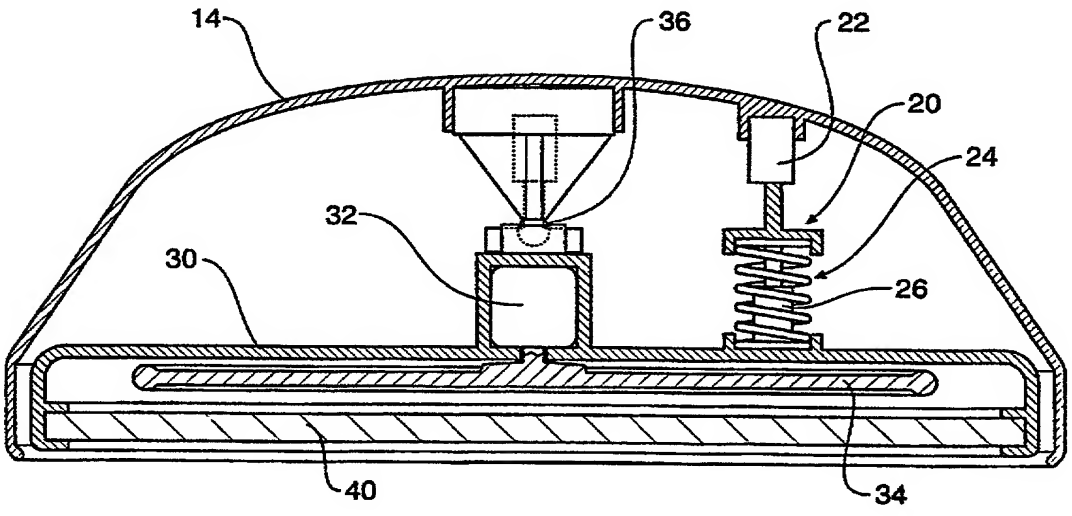
(54) Title: VIBRATION SUPPRESSED VEHICLE MIRROR



(57) Abstract: A vehicle external rear vision mirror assembly comprising: a support arm; a mirror frame (14) mounted on an end of the support arm; a support portion (30) connected to the mirror frame (14); a flywheel (34) rotatably mounted with respect to the support portion (30); a means for rotating the flywheel (34); a mirror (40) mounted to the support portion (30), the mirror (40) having a reflective surface orientated substantially normal to the rotational axis of the flywheel (34); and a connection means connecting the support portion (30) to the mirror frame (14), the connection means arranged and constructed such that the angle of the support portion (30), with respect to the mirror frame (14), can be adjusted, whereby the flywheel (34) stabilises the mirror (40) against tilting vibrational movement. The mirror (40) may be mounted either to the support portion (30) (and therefore non-rotatable) or may be mounted directly to the flywheel (34).

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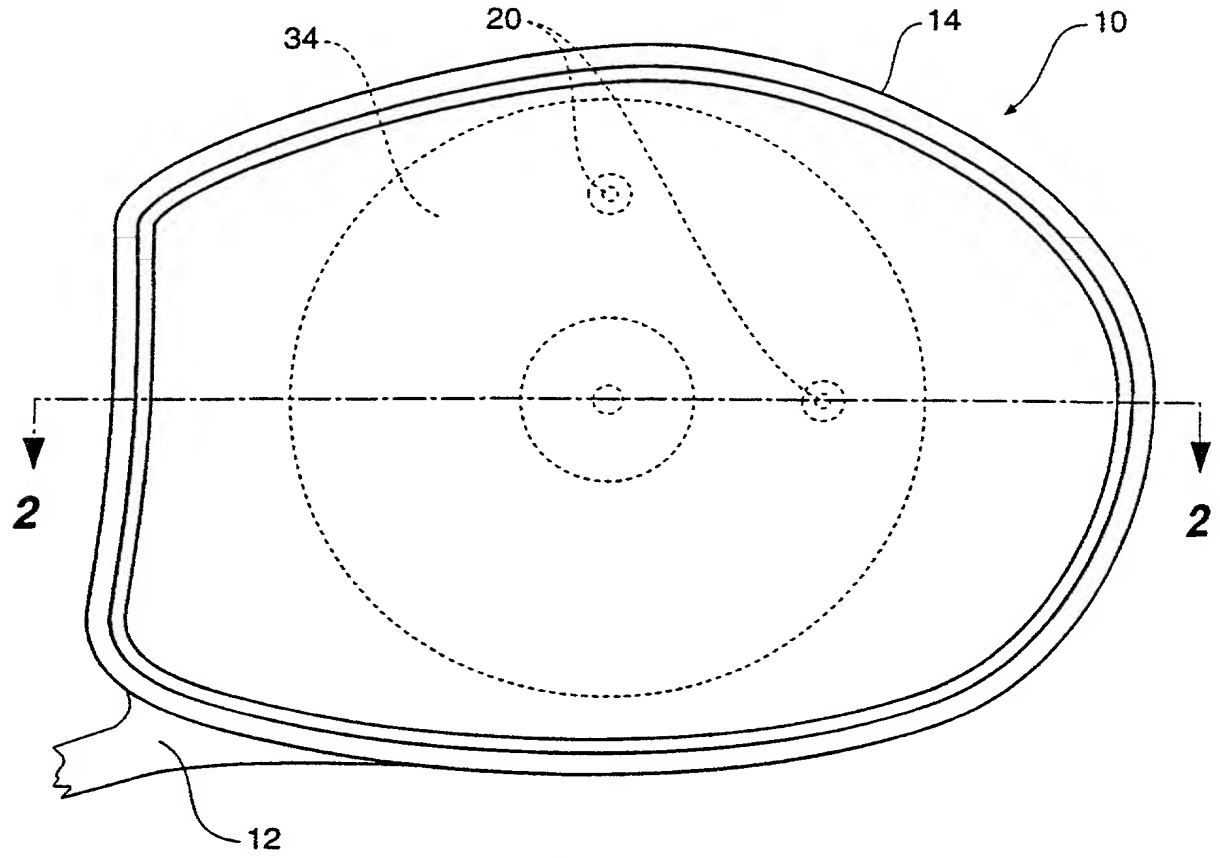

Fig 1

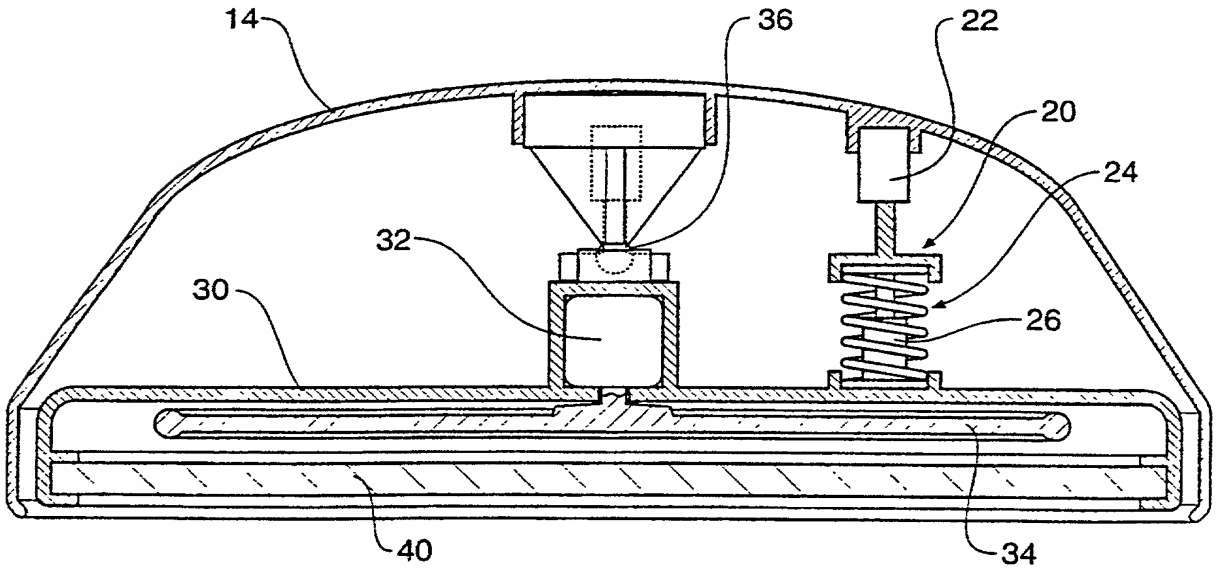

Fig 2

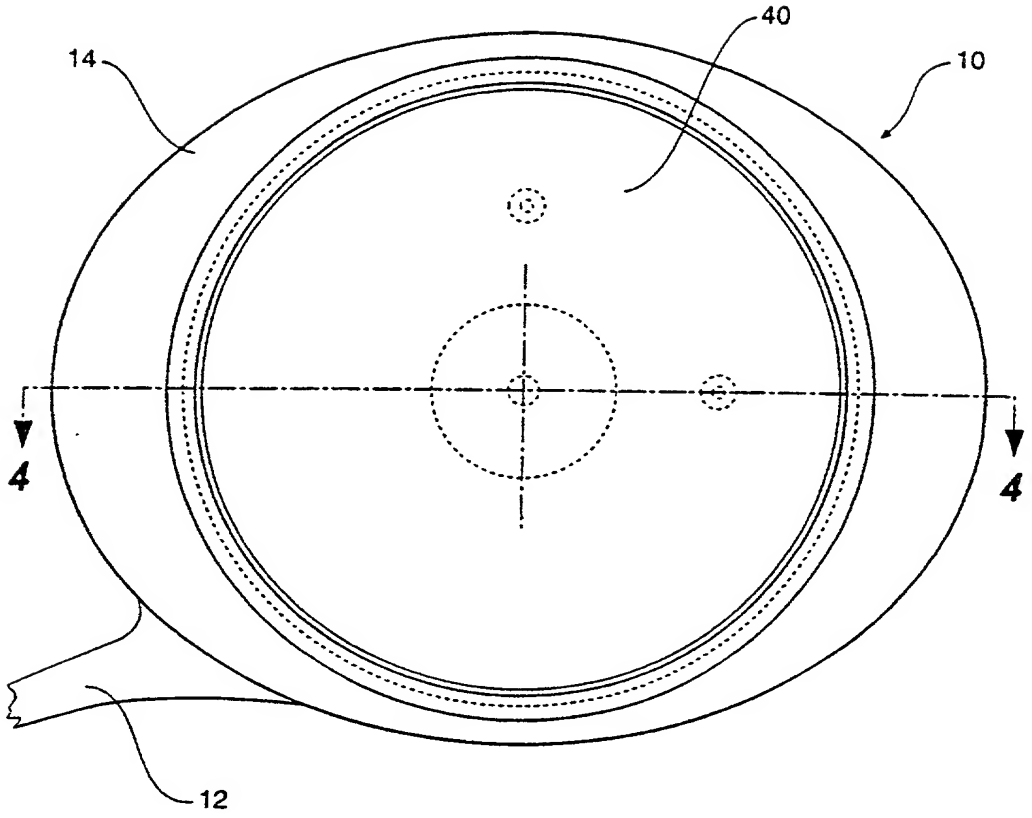

Fig 3

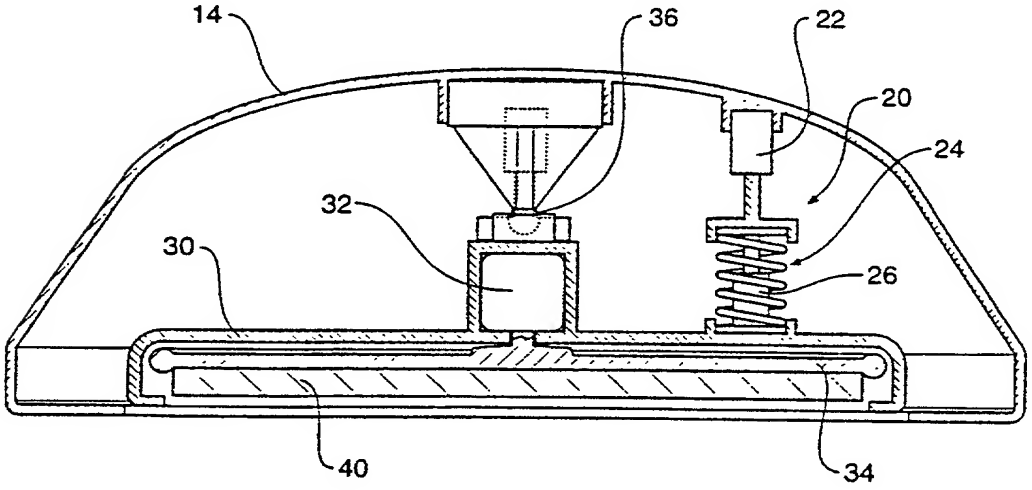

Fig 4

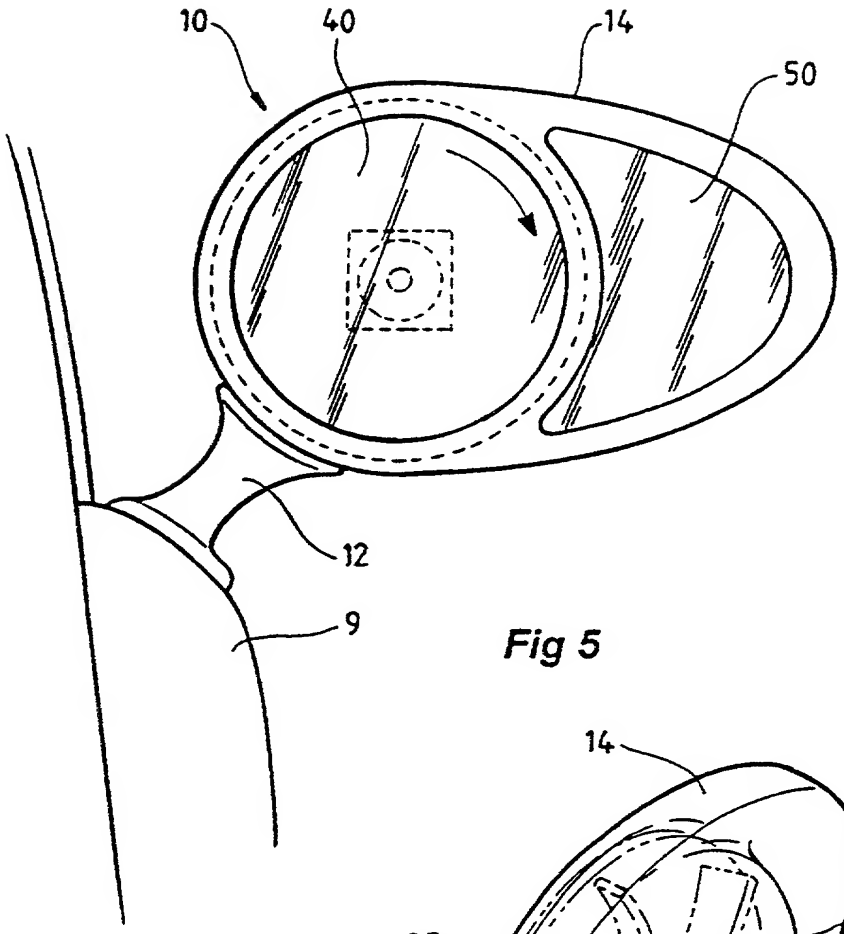

Fig 5

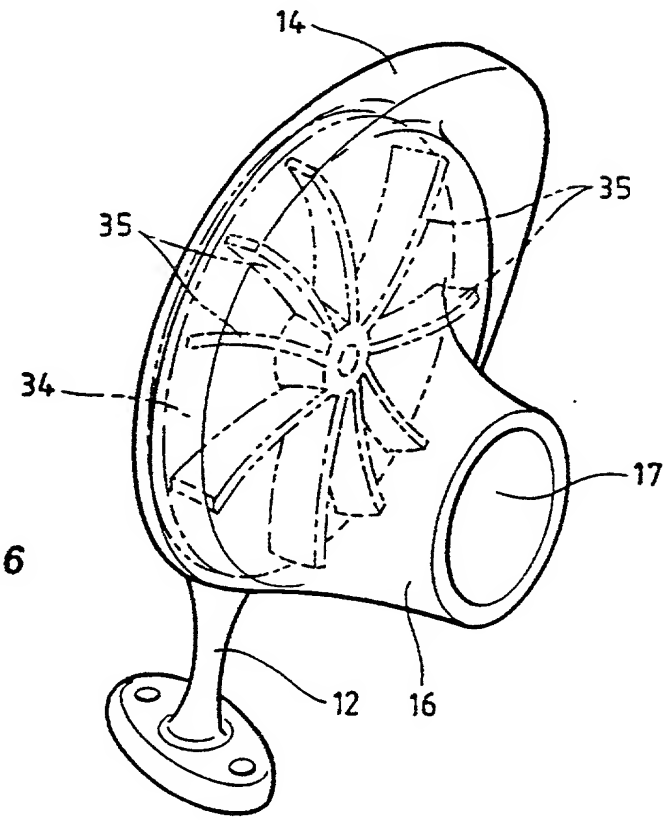

Fig 6

USA

Attorney Docket No BRI-00064

DECLARATION AND POWER OF ATTORNEY
(Sole Inventor Only)

As a below named inventor, I declare that:

My residence, post office address and citizenship are as stated below next to my name; that I believe I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention or design entitled: "VIBRATION SUPPRESSED VEHICLE MIRROR" the specification of which:

__X__ is attached hereto; or

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that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above; and that I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to patentability as defined in 37 CFR 1.56.

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Number	Country	Date Filed	Priority Claimed
PQ 3020	Australia	23rd September 1999	Yes

I hereby appoint my attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith, and to file and prosecute any international patent applications filed thereon before any international authorities under the Patent Cooperation Treaty.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false

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